Docket No.: M4065.0993/P993
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Peter Parker Altice Jr.

Application No.: 10/751,440 Confirmation No.: 2571

Filed: January 6, 2004 Art Unit: 2622

For: IMAGER DEVICE WITH DUAL STORAGE NODES Examiner: C. W. A. CHEN

APPELLANT'S REPLY BRIEF UNDER 37 C.F.R. § 41.41

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Reply Brief is filed pursuant to 37 C.F.R. § 41.41 and is responsive to the Examiner's Answer mailed December 23, 2008 in connection with the appeal from the final rejection of claims 1-45 in the above-identified U.S. patent application.

I. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 45 claims pending in the application.

B. Current Status of Claims

1. Claims canceled: None

2. Claims withdrawn from consideration but not canceled: None

3. Claims pending: 1-45

4. Claims allowed: None

5. Claims rejected: 1-45

C. Claims On Appeal

The claims on appeal are claims 1-45

II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are:

A. The rejection of claims 1, 2, 4, 6, 9, 10-12, 14, 16, 19, 20-25, and 27-35 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 7,286,174 issued to Weale et al. ("Weale") in view of U.S. Patent Nos. 6,710,804 ("Guidash '804") or 6,160,281 ("Guidash '281").

B. The rejection of claims 3, 5, 7, 8, 13, 15, 17, 18, and 26 under 35 U.S.C. § 103(a) as being unpatentable over Weale in view of Guidash '804 and U.S. Patent No. 6,069,376 issued to Merrill ("Merrill").

C. The rejection of claims 36, 37, 39, 41, 44, and 45 under 35 U.S.C. § 103(a) as being unpatentable over Weale in view of Guidash '804 and U.S. Patent Application Publication No. 2003/0090575 ("Miyamoto").

D. The rejection of claims 38, 40, 42, and 43 under 35 U.S.C. § 103(a) as being unpatentable over Weale in view of Guidash '804, Merrill, and Miyamoto.

III. ARGUMENT

Although the Examiner's Answer does not raise any new grounds for rejection, the Examiner's Answer does offer new interpretations of Appellant's claims and Appellant writes here to respond to the new interpretations and Examiner's remarks regarding Appellant's arguments in the Appeal Brief.

A. The rejection of claims 1, 2, 4, 6, 9, 10-12, 14, 16, 19, 20-25, and 27-35 should be reversed because the combination of Weale and Guidash does not teach or suggest all of the limitations of independent claims 1, 11, 24, 25, and 33.

As discussed in the Appeal Brief, independent claim 1 is drawn to a pixel cell that includes "a first storage node for storing charge generated at a photosensitive element during an integration period...and a second storage node for storing a portion of said charge generated by said photosensitive element during the integration period that is not stored by said first storage node". (emphasis added). Claim 1 only refers to one integration period (i.e., "an integration period" and "the integration period"). Therefore, as recited by claim 1, the charge stored by both the first storage node and second storage node is charge generated by the photosensitive element during the same integration period. By storing charge from one photosensitive element captured during one integration period on both the first storage node and second storage node, the pixel cell provides a larger charge storage capacity and an increased signal to noise ratio for a single integration period than a pixel cell using only one storage node per integration period or having no storage node at all. (Present specification, Abstract and paragraph [0007]).

Independent claims 11 and 14 are drawn to semiconductor chips, claims 25 and 33 are drawn to methods for operating image sensors, and claim 36 is drawn to a processor system, but each of the independent claims include limitations similar to those of claim 1 discussed above.

Appellant respectfully submits that the Weale and Guidash combination does not teach or suggest this limitation because (as discussed below) Weale requires storing charge from a first integration period at a first storage node and storing charge from a second and different integration period at a second storage node.

Weale illustrates a pixel in FIG. 1 (reproduced below) that includes a photo site 110, a first storage node 120 and a second storage node 140. (Weale, column 3, lines 42-46). Weale states that "the control circuitry [for the pixel] transfers a first collected signal from the photo site to the first storage node during a first period, transfers a second collected signal from the photo site to the second storage node during a second period that follows the first period, and then transfer[s] the first and second collected signals out of the pixel during a third period that follows the second period." (Weale, column 3, lines 46-53).

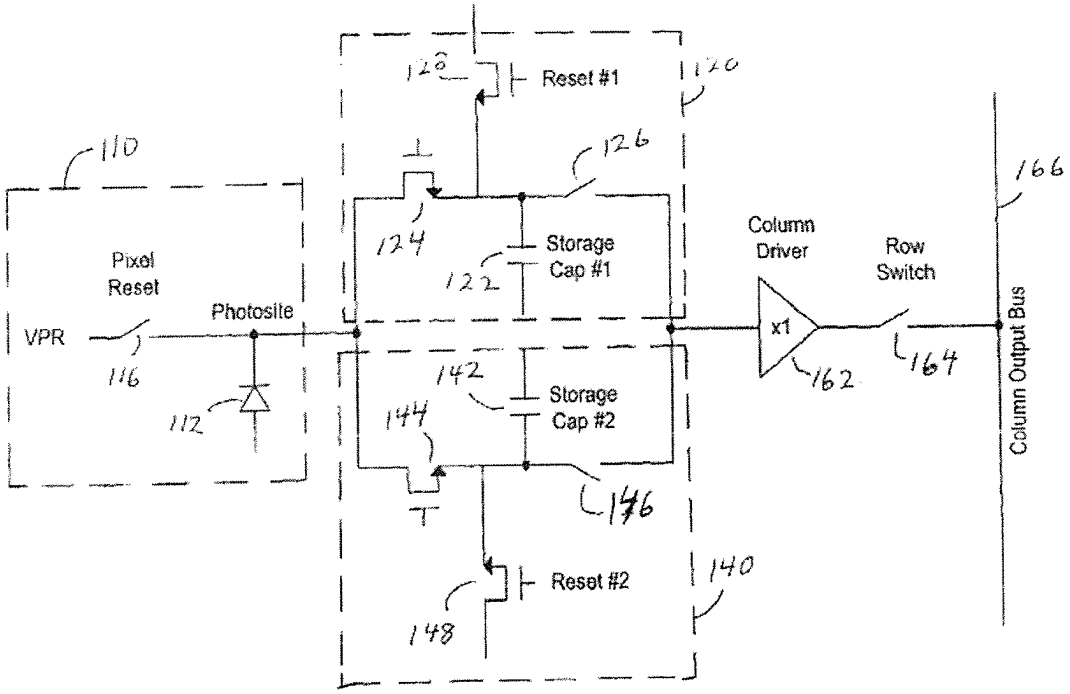

FIG. 1

Weale explicitly teaches that the first period and the second period are separate and distinct first and second integration periods. For example, at column 19, lines 53-67 (as cited by the Examiner's Answer at page 16) Weale recites that:

> "In operation, an image capture cycle includes the following time intervals:
>
> t_{RESET1} control signals initiate the reset of all nodes in the pixel;

t_{INT1} a PR low transition initiates the first integration period;

t_{S1} a S1 low transition completes sample and hold operation of buffered output by first storage node;

t_{RESET2} reset the pixel and second storage node prior to second integration;

t_{INT2} a PR low transition initiates the second integration period;

t_{S2} an S2 low transition completes sample and hold operation of buffered output by second storage node; and

t_{READ} a SEL high transition places the pixel outputs on OUT1 and OUT2." (emphasis added).

Thus, Weale teaches that each image capture cycle includes two integration periods and that charge from the first integration period is stored at a first storage node and charge from the second integration period is stored at a second storage node. Because Weale does not teach or suggest "a first storage node for storing charge generated at a photosensitive element during an integration period...and a second storage node for storing a portion of said charge generated by said photosensitive element during the [same] integration period that is not stored by said first storage node" as recited by claim 1, the Weale and Guidash combination does not teach or suggest all the limitations of claim 1 or independent claims 11, 14, 25, 33, and 36, which include similar limitations.

Despite the explicit use of the phrase "integration period" by Weale described above, the Examiner's Answer insists that the "image capture cycle" of Weale is really an "integration period" as the phrase is used by the Appellant in its independent claims. (Examiner' Answer, pages 15-16). Therefore, the Examiner's Answer implicitly reasons that all charge captured during the image capture cycle of Weale is from a single integration period and is divided between the first and second storage nodes. Appellant respectfully submits that this reasoning is incorrect.

The Examiner's Answer bases the statement that the "image capture cycle" of Weale is actually an "integration period" in part on the incorrect assumption that "the single image capture cycle of Weale only produces a *single* image, not two images" and that "a conventional definition of integration period is applied and is taken to mean a time period wherein a photosite is exposed to

capture a single image." (Examiner's Answer, pages 16-17). Appellant respectfully submits that this assumption is incorrect because the "image capture cycle" of Weale includes a first integration period and a second integration period that produce a first image and a second image, respectively.

For example, as discussed above with regard to FIG. 1, Weale teaches that the pixel "transfer[s] the first and second collected signals out of the pixel during a third period that follows the second period." (Weale, column 3, lines 46-53). The first and second collected signals of Weale from the first and second integration periods relate to first and second images, respectively. This fact is clear because Weale discusses using these two separately captured and stored images for a variety of purposes, each of which require a first image and a second image. For example, Weale teaches imaging a first scene illuminated by a strobe light by capturing and storing charge on storage site #1 during a first integration period, and capturing and storing charge on storage site #2 during a second integration period during which the strobe is off. (Weale, column 2, lines 24-39).

Weale also teaches that "[s]ubsequently, the two sites are read out and subtracted from each other producing a difference signal that corresponds to the scene as illuminated only by the strobed source." (Weale, column 2, lines 40-43). Appellant speculates that this statement may be the source of the Examiner's Answer's incorrect statement the Weale only produces one scene from each image capture cycle. (Examiner's Answer, page 16). While it is true that Weale ultimately produces one scene from the image capture cycle, the above statement by Weale makes it clear that Weale teaches first producing two intermediate scenes from each image capture cycle, which, by the Examiner's own definition, requires two integration periods, regardless of any processing that may occur after the two scenes are obtained.

The Examiner's Answer also tries to justify its incorrect assumption that the "image capture cycle" of Weale is actually an "integration period" by claiming that Weale "applies an unconventional definition of the word 'integration period'." In the Examiner's Answer mailed December 23, 2008, the Examiner (for the first time) provides a "plain meaning" definition of the term "integration period" found in independent claims 1, 11, 24, 25, and 33. (Examiner's Answer, page 15). The definition the Examiner's Answer provides for "integration period" is "the time that between the exposure of incident light to a photosensor and the readout of the charges accumulated

by the photosensor." (Examiner's Answer, page 15). The Examiner cites an unrelated, and heretofore, uncited patent application publication, U.S. Patent Application Publication No. 2008/0192132 ("Bechtel"), to support this first plain meaning. Id.

Appellant respectfully submits that, assuming *arguendo* that the plain meaning of "integration period" may be found in Bechtel (as alleged by the Examiner's Answer), the definition is consistent between the present application, Weale, and Bechtel; furthermore, the Weale and Guidash combination still does not anticipate independent claims 1, 11, 14, 25, 33, and 36 even using the "plain meaning" definition provided by the Examiner's Answer.

The Examiner's Answer states that Bechtel defines "integration period" at paragraph [0096] as "the time that between the exposure of incident light to a photosensor and the readout of the charges accumulated by the photosensor." (Examiner's Answer, page 15, emphasis added). Appellant respectfully submits that the Examiner's interpretation of Bechtel's definition of "integration period" is incorrect. For example, paragraph [0096] of Bechtel does not include the words "exposure", "incident", "light", "photosensor", "charges", or "accumulated." (Bechtel, paragraph [0096]). Bechtel does, however, state that "reset takes place to begin the integration period" and that "[t]he readout typically occurs, ending integration, at a low sequencing clock count." (Bechtel, paragraph [0096], page 16, a little less than halfway down the page in the left column). Therefore, it is proper to infer that Bechtel actually defines the integration period as the time between the reset of the photosensor and the beginning of the readout of the photosensor, i.e., when the charge is transferred out of the photosensor. Bechtel also makes it clear, as is well known in the art, that the readout of the photosensor is made up of a "sequence" having more than one "stage". (Bechtel, paragraph [0096]).

Appellant respectfully submits that Weale applies the same definition of the phrase "integration period" as Bechtel, which the Examiner has held out as demonstrating the ordinary meaning of the phrase. For example, Weale states that:

> "Prior to the start of signal integration the signals on the two storage nodes are reset. The signal is then integrated on the photosite. At the end of the integration

period it is transferred to the first storage node." (Weale, column 18, lines 55-59).

Therefore, Weale teaches that an integration period begins after the nodes are reset, including the photo site 110, and ends before the charge is output from the photo site 110 to the first storage node.[1] This is the same definition of integration period as is provided by Bechtel.

Finally, it should be noted that the specification and the claims of the present application use the phrase "integration period" in the same way as both Weale and Bechtel. For example, FIG. 5 (reproduced below) of the present application shows that the integration period ("INTEGRATION") extends between times T_2 to T_5.

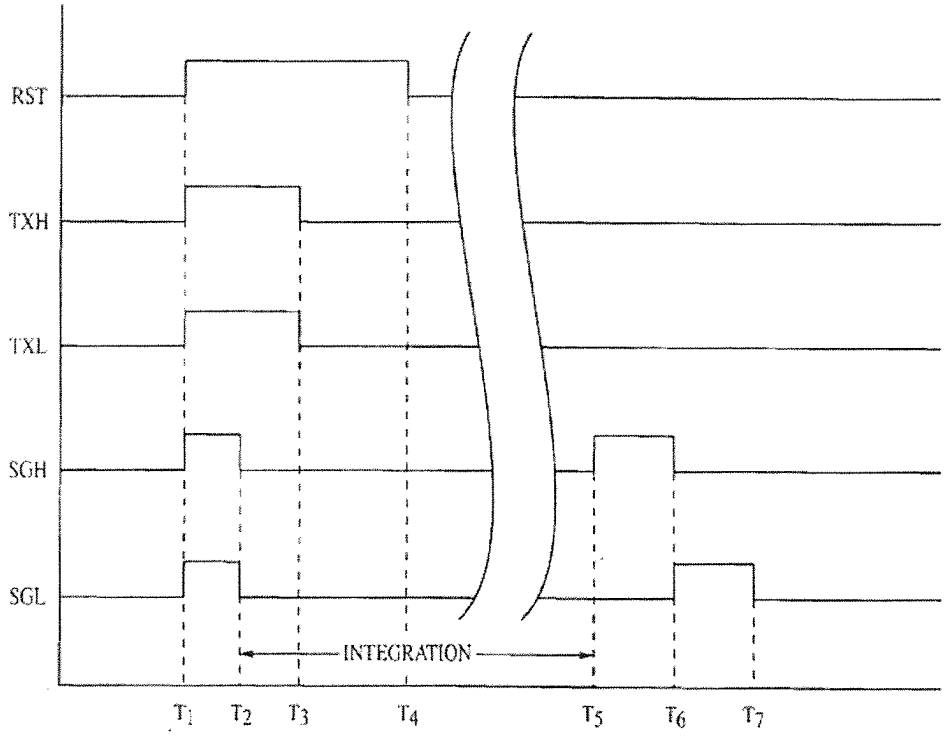

FIG. 5

[1] Appellant acknowledges that in the Appeal Brief at page 8, Appellant stated that Weale defines an integration period in which "one integration period ends and the next integration period begins when the photosite is reset." This statement is not inconsistent with the current description of an integration period by Weale because Weale teaches that a photosite "is implicitly reset by virtue of the charge transfer operation." (Weale, column 6, lines 46-49).

The present application states that "[a]t time T2, control signals SGH and SGL both go logic LOW, thereby deactivating shutter gate transistors 304, 385 and resetting photodiode 302." (Present application, paragraph [0031], emphasis added). Furthermore, the present application states that "[a]t time T5, control signal SGH is raised to logic HIGH and the charge generated by photodiode 302 is transferred to storage node 306." (Present application, paragraph [0032], emphasis added). Therefore, the present application teaches that the integration period is the time between the reset of the photodiode and the beginning of the readout of the photodiode, i.e., when the charge is transferred out of the photodiode.

Therefore, it can be seen that the definition of "integration period" is consistent between the present application, Weale, and Bechtel; furthermore, the Weale and Guidash combination does not anticipate independent claims 1, 11, 14, 25, 33, and 36. Accordingly, the rejection of independent claims 1, 11, 24, 25, 33, and 36 should be reversed. The remaining claims 2, 4, 6, 9, 10, 12, 14, 16, 19, 20-23, 27-32, 34 and 35 depend from claims 1, 11, 24, 25, or 33, or 36 and their rejection should be reversed for the same reason.

IV. CONCLUSION

For the foregoing reasons, Appellant respectfully submits that the claimed invention is not rendered obvious by the cited combination of references, and reversal of the final grounds of rejection is respectfully solicited.

Dated: February 23, 2009

Respectfully submitted,

By _____ #41,198

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